ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24JUN1355

Prevalence of Xerophthalmia in Rural Children of Latur, Maharashtra

Dr. Smital Dipak Jaiswal
Junior Resident,
Dept. of Ophthalmology,
Vilasarao Deshmukh Government Medical College, Latur.

Dr. Uday S. Mohite
Professor and Head of Department ,
Dept. of Ophthalmology,
Vilasarao Deshmukh Government Medical College, Latur.

Dr. Vivek S. Gosavi
Assistant Professor,
Department of Ophthalmology,
Vilasarao Deshmukh Government Medical College, Latur.

Dr. Mayur Kulkarni
Assistant Professor,
Department of Ophthalmology,
Vilasarao Deshmukh Government Medical College, Latur.

Correspondence to:
Dr. Smital Dipak Jaiswal
Vilasarao Deshmukh Government Medical
College, Latur.

Abstract:-

- ***Purpose***

To ascertain the prevalence of Vitamin A deficiency (VAD) among rural children in Latur, Maharashtra.

- ***Methods***

The study was conducted in a community setting and used a cross-sectional design, meaning data was collected at a single point in time. A total of 1,604 children aged 0-15 years from rural areas in Latur, Maharashtra, participated in the study. Participants were chosen using a simple random sampling method, ensuring each child in the population had an equal chance of being selected. Data collection involved a pretested structured questionnaire, which helps ensure consistency and reliability in the responses, and ophthalmic examinations to check for Vitamin A deficiency.

- ***Results***

The study found an overall Xerophthalmia prevalence of 5.6%. In children under six years old, the prevalence of Bitot's spots was 2.1%, compared to 4.2% in children over six. Older children were more frequently affected by Xerophthalmia. Factors contributing to Xerophthalmia included low income, poor consumption of fruits and vegetables, febrile illnesses, and lack of immunization. Additionally, the study noted that dietary patterns and economic status significantly influenced the prevalence of VAD. Children from lower-income families and those with limited access to nutritious foods were at a higher risk.

- ***Conclusion***

The findings suggest a declining trend in Vitamin A deficiency, with a milder form of Xerophthalmia and a 2.1% prevalence of Bitot's spots among children under six years old. The higher prevalence of Xerophthalmia in older children highlights the need to strengthen Vitamin A prophylaxis programs and promote health education to improve dietary diversity. It is essential to ensure the inclusion of vegetables and fruits in children's diets to maintain better Vitamin A status across all age groups.

Keywords:- *Prevalence, Vitamin A, Xerophthalmia.*

I. INTRODUCTION

Xerophthalmia includes the entire range of eye problems caused by vitamin A deficiency, from night blindness to severe corneal damage (keratomalacia).[1] This condition is a major cause of childhood blindness in developing countries.[2] Around 250 million preschool children, mostly in developing countries, are at risk of vitamin A deficiency.[3-5] Globally, an estimated 1.5 million children are blind and 5 million are visually impaired due to this deficiency, with approximately 350,000 children becoming blind each year from xerophthalmia.[6]

Vitamin A is crucial for maintaining eye health. It acts as a precursor to photosensitive pigments in the retina, which are essential for initiating the visual pathway. It also plays a critical role in the differentiation and growth of epithelial cells in the conjunctiva and cornea. As a result, xerophthalmia can manifest as night blindness, dryness of the conjunctiva and cornea, corneal ulcers, keratomalacia, and scarring of the cornea.[7]

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24JUN1355

Vitamin A is essential in small quantities for normal visual function and maintaining the integrity of epithelial cells. While vitamin A deficiency (VAD) can impact people of all ages, it poses a particularly severe and potentially life-threatening risk to children under six years old.[8]

Given the critical importance of addressing VAD across all age groups, this study was conducted among children aged 0-15 years in Latur, Maharashtra, to determine the prevalence of VAD, with a focus on biosocial factors influencing this condition.

II. METHOD

A community-based cross-sectional study was carried out in a rural region of Latur, Maharashtra. The study site was selected using simple random sampling from villages under a Primary Health Center. The chosen rural area encompassed 1,604 children aged 0-15 years. A door-to-door survey was conducted, and data was collected using a standardized questionnaire. Information gathered included age, gender, residential location, grade of study, and parental details such as education, occupation, family size, and income. Parents were specifically queried about night blindness, and responses were considered valid only if they were definitive.

The study employed standard ophthalmic examination techniques as described by Sommer (1994) to detect xerophthalmia. Medical professionals performed ocular assessments using a bright illuminant torch under natural lighting conditions. The study utilized the WHO classification of xerophthalmia, as detailed in WHO Technical Report Series No. 590 (1976). It's noteworthy that according to the WHO report, conjunctival xerosis (X1A) is not recommended for community-level diagnosis (Sommer, 1994). According to these guidelines, the study included only cases where conjunctival xerosis (X1A) was accompanied by Bitot's spots (X1B) as positive clinical signs of xerophthalmia in the data presented.[8]

The socioeconomic status of the participants was evaluated using the modified Kuppuswamy socioeconomic scale, according to Mahajan and Gupta (1995). This scale evaluates three primary family factors: the education level of the head of the family, their occupation, and the total monthly family income. Each category is assigned a score, and the combined score is used to classify the family's overall socioeconomic status. Hemoglobin levels were measured for all children in the study. For children under six years old, a hemoglobin level below 11 g/dl was used to diagnose anemia, while for children over six years old, the cut-off was 12 g/dl (Park, 2011Children diagnosed with xerophthalmia were treated with an oral regimen of 200,000 IU of Vitamin A over a period of two days. This high-dose vitamin A therapy is designed to rapidly replenish vitamin A levels and improve symptoms. This dosage is intended to quickly replenish Vitamin A levels and address the deficiency symptoms. Statistical analysis of the data was conducted using the chi-square test to identify significant associations between variables. Additionally, the odds ratio was calculated to measure the strength of these associations, with a 95% confidence interval to ensure the reliability of the results..[8]

III. RESULTS

(Table 1) presents the distribution of xerophthalmia prevalence across various age groups. The overall prevalence was 5.4%, with only mild forms such as night blindness and Bitot's spots observed, and no cases of active corneal involvement. The prevalence increased with age, peaking at 11.6% among those aged 13-15 years. While the overall prevalence was 5.4%, the total prevalence of signs and symptoms was 4.4% because eight subjects exhibited multiple signs or symptoms. Bitot's spots were detected in 0.9% of children under six years old and in 3.3% of children over six years old. The increase in the prevalence of xerophthalmia with age was statistically significant. This indicates that as children get older, they are more likely to develop xerophthalmia, with the correlation confirmed by statistical analysis.

Table 1: Manifestations of Xerophthalmia by Age Group

AGE	N	XN only	Bitot's spots (XIB)	Both XN and XIB	Total
0-3	308	1	2	0	3 (0.6%)
4-6	340	4	4	2	10 (2.9%)
7-9	364	6	6	3	15 (3.9%)
10-12	316	10	13	6	29(9.0%)
13-15	276	13	14	6	33 (11.7%)
Total	1604	34	39	17	90 (5.6%)

(Table 2) presents the prevalence of xerophthalmia across various sociodemographic factors. The data reveals that boys had a higher prevalence of xerophthalmia compared to girls.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24JUN1355

Table 2: Prevalence of xerophthalmia by gender

Sex	N	Affected Children
Male	994 (62%)	59 (5.9%)
Female	610 (38%)	31 (5.08%)

The study revealed an overall prevalence of Xerophthalmia at 5.6%. Among the observed manifestations, only milder forms such as night blindness and Bitot's spots were noted, with no cases of active corneal involvement. Xerophthalmia prevalence showed an increase with age, reaching its peak in the 13-15 year age group at 11.7%. While the overall prevalence of Xerophthalmia was 5.6%, signs and symptoms were observed in 5.1% of cases, with 17 subjects exhibiting more than one sign or symptom. Bitot's spots were prevalent in 2.1% of children under six years old and 4.1% in those above six. The age-related increase in Xerophthalmia prevalence was statistically significant. Higher prevalence rates were observed among boys, those from lower socioeconomic backgrounds, and children from families with five or more members, although these differences did not reach statistical significance.

IV. DISCUSSION

The first randomized trial assessing the effect of vitamin A supplementation on child mortality took place in Indonesia and was published in 1986. Xerophthalmia, resulting from vitamin A deficiency, is the leading cause of childhood blindness globally, with around 350,000 new cases annually. Despite its frequent occurrence, xerophthalmia remains relatively rare in the developing world. This low prevalence is due to the high mortality rates among children with severe vitamin A deficiency; most children with VAD severe enough to cause corneal ulceration do not survive beyond their first year.[7]

In this study, our focus was on assessing the prevalence of xerophthalmia specifically among malnourished children in Latur, Maharashtra. By narrowing our investigation to this vulnerable group, we aimed to understand the extent and severity of Vitamin A deficiency-related eye conditions within this particular population subset. This approach allows for targeted insights that can inform tailored interventions and strategies to improve nutritional outcomes and eye health among malnourished children in the region. Vitamin A deficiency (VAD) manifests in various clinical forms, but xerophthalmia is a distinct indicator. Vitamin A supplementation is believed to prevent deaths primarily by reducing complications from less severe manifestations of measles and diarrheal diseases in children[10]. Thanks to the pioneering efforts of these individuals, more than 70 countries have implemented national programs to address vitamin A deficiency (VAD). Vitamin A coverage has become a vital health metric reported annually in the State of the World's Children report. UNICEF estimates that the distribution of over 500 million vitamin A capsules annually helps prevent approximately 350,000 childhood deaths. This widespread distribution of supplements plays a critical role in reducing mortality rates associated with VAD globally[11].

The decrease in prevalence of xerophthalmia observed in your study compared to the Garg study (Garg S, et al., 1984) could indeed be linked to the introduction of Vitamin A deficiency prevention programs. These programs often include strategies such as supplementation, fortification of food with Vitamin A, and public health campaigns promoting dietary diversification. Such initiatives aim to ensure adequate intake of Vitamin A among at-risk populations, thereby reducing the incidence of xerophthalmia and other Vitamin A deficiency-related conditions. Thus, the lower prevalence in your study may reflect the effectiveness of these interventions in improving nutritional status and eye health among children up to 15 years old[8].

Despite these promising findings, Vitamin A deficiency (VAD) continues to be a major contributor to illness and death in specific populations in the developing world. A national survey conducted in Ethiopia during 1980–81 revealed that approximately 60% of children under 6 years old experienced subclinical VAD, characterized by serum retinol levels below 0.70 μmol/L[12]. A recent survey conducted in Wukro, northern Ethiopia, found comparable results among children aged 6–9 years regarding the prevalence of xerophthalmia. This suggests that the issue of Vitamin A deficiency and its associated conditions remains relevant in different geographic and demographic contexts, despite efforts to address it through various public health interventions. The prevalence of xerophthalmia in these studies was documented as 6% and 5.8%, respectively. Many of the adverse effects of Vitamin A deficiency (VAD) can be prevented, and three main preventive strategies have been proposed: (1) regular supplementation with high-potency vitamin A; (2) fortification of foods with vitamin A; and (3) enhancing accessibility to vitamin A-rich foods.[14]

V. CONCLUSION

Our study reveals a decreasing trend in vitamin A deficiency (VAD), with a less severe form of Xerophthalmia observed. The higher incidence of Xerophthalmia among older children underscores the need to enhance Vitamin A prophylaxis programs and promote health education to encourage dietary diversity. Incorporating vegetables and fruits into children's diets is crucial for maintaining improved vitamin A levels across different age groups. However, several limitations should be noted. This study was conducted at a single site, and all participants were seeking evaluation for malnutrition. Therefore, our findings may not fully represent the entire pediatric population.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24JUN1355

ACKNOWLEDGEMENTS

The authors extend their heartfelt gratitude to the Head of the Department, the research guide, and all contributors whose invaluable support and expertise were essential to the success of this study. Without their contributions, this research would not have been possible.

REFERENCES

[1]. WHO/NMH/NHD/EPG. Xerophthalmia and night blindness for the assessment of clinical vitamin A deficiency in individuals and populations. J Clin Diagn Res. 2014;5(8):1627-1630.
[2]. WHO/NMH/NHD/EPG. Xerophthalmia and night, blindness for the assessment of clinical vitamin A deficiency in individuals and populations. Vitamin and Mineral Nutrition Information System (VMNIS). 2014.
[3]. Tarik Kassaye OR, Johns T, Becklake MR. Prevalence of vitamin A deficiency in children aged 6–9 years in Wukro, northern Ethiopia. Bull World Health Organ. 2001;79(5).
[4]. Pepping F, Kavishe F, Hackenitz E, West C. Prevalence of xerophthalmia in relation to nutrition and general health in preschool-age children in three regions of Tanzania. Acta Paediatr. 1988;77(6):895-906.
[5]. World Health Organization. Global Prevalence of Vitamin A Deficiency in Populations at Risk 1995–2005: WHO Global Database on Vitamin A Deficiency. Geneva, Switzerland: World Health Organization; 2009.
[6]. Whitcher J, Srinivasan JM, Upadhyay MP. Corneal blindness: a global perspective. Bull World Health Organ. 2001;79:214-221.
[7]. Moore DB, Shirefaw W, Tomkins-Netzer O, Eshete Z, Netzer-Tomkins H, Ben-Zion I. Prevalence of xerophthalmia among malnourished children in rural Ethiopia. Int Ophthalmol. 2013 Oct;33(5):455-9.
[8]. Agrawal VK, Agrawal P, Dharmendra. Prevalence and determinants of xerophthalmia in rural children of Uttar Pradesh, India. Nepal J Ophthalmol. 2013 Jul-Dec;5(2):226-9.
[9]. Sommer A, Tarwotjo I, Djunaedi E, West KP Jr, Loeden AA, Tilden R, Mele L. Impact of vitamin A supplementation on childhood mortality. A randomised controlled community trial. Lancet. 1986 May 24;1(8491):1169-73.
[10]. Glasziou PP, Mackerras DE. Vitamin A supplementation in infectious diseases: a meta-analysis. BMJ. 1993 Feb 6;306(6874):366-70. doi: 10.1136/bmj.306.6874.366. PMID: 8461682; PMCID: PMC1676417.
[11]. Sommer A. Vitamin A deficiency and clinical disease: an historical overview. J Nutr. 2008 Oct;138(10):1835-9.
[12]. Wolde-Gebriel Z, Demeke T, West CE. Xerophthalmia in Ethiopia: a nationwide ophthalmological, biochemical and anthropometric survey. Eur J Clin Nutr. 1991 Oct;45(10):469-78.
[13]. Kassaye T, Receveur O, Johns T et al. Prevalence of vitamin A deficiency in children aged 6–9 years in Wukro, northern Ethiopia. Bull World Health Organ. 2001;79:415–422.
[14]. West KP Jr. Extent of vitamin A deficiency among preschool children and women of reproductive age. J Nutr. 2002;132(9 Suppl):2857S–66S.